



Europäisches Patentamt  
European Patent Office  
Office européen des brevets



(11) Publication number: **0 677 768 A1**

(12)

## EUROPEAN PATENT APPLICATION

(21) Application number: **95105451.9**

(51) Int. Cl.<sup>6</sup>: **G02F 1/1335**

(22) Date of filing: **12.04.95**

(30) Priority: **12.04.94 US 229337**

(43) Date of publication of application:  
**18.10.95 Bulletin 95/42**

(84) Designated Contracting States:  
**AT BE CH DE DK ES FR GB GR IE IT LI LU MC  
NL PT SE**

(71) Applicant: **OIS Optical Imaging Systems, Inc.**  
**1896 Barrett Street**  
**Troy,**  
**Michigan 48084 (US)**

(72) Inventor: **Abbleah, Adiel**  
**34950 Valley Forge Drive**  
**Farmington Hills, MI 48331 (US)**  
Inventor: **Vergith, Nicholas D.**  
**877 Elm Street**  
**Holly, MI 48442 (US)**

(74) Representative: **Prato, Roberto et al**  
**Studio Torta,**  
**Via Viotti 9**  
**I-10121 Torino (IT)**

(54) **Liquid crystal display with improved viewing characteristics.**

(57) A backlight liquid crystal display including a collimated backlight (2) for illuminating a display panel having a liquid crystal layer (9) sandwiched between rear and front polarizers (3,15), the panel including an optical refracting film (17) comprises optical facets (19) and a diffuser (21) laminated adjacent the front surface of the panel. The refracting film and light scattering diffuser may be either exterior or interior the front polarizer, but on the viewer side of the liquid crystal layer. The optical system of the refracting faceted film along with the diffuser maintains the resolution of the display, improves the contrast ratio over a wide range of viewing angles, reduces its ambient light reflectively, reduces color shifting, substantially eliminates inversion, and enlarges the effective viewing zone of the display.

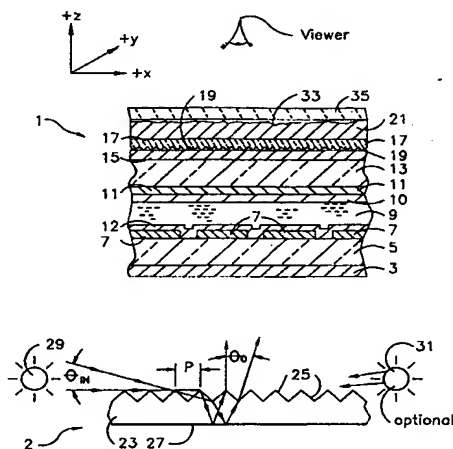


Fig. 1(a)

EP 0 677 768 A1